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IS 10612 (1983): 4-Jaw Independent Lathe Chucks [PGD 2: Machine Tool Elements and Holding Devices]

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Indian Standard

SPECIFICATION FOR
4-JAW INDEPENDENT LATHE CHUCKS

Machine Tools, Machine Tool Elements and Woodworking Machines Sectional Committee, EDC 11; Chucks Subcommittee, EDC 11:5 [Ref : Doc : EDC 11 (3370)]

1. Scope — Specifies the requirements for 4-Jaw independent lathe chucks.

2. Type

Type A — Back mounted chucks (chucks which are screwed from the rear);

Type B — Front mounted chucks (chucks which are bolted from the front); and

Type C — Direct mounted chucks (chucks which are mounted directly on type A or camlock spindle noses conforming to IS : 2582 (Part 1)-1972 'Dimensions for lathe spindle noses and face plates: Part 1 Spindle noses, Type A (*first revision*)' or IS : 2582 (Part 2)-1972 'Dimensions for lathe spindle noses and face plates: Part 2 Spindle noses camlock types (*first revision*)' respectively.

3. Terminology — *See also* Fig. 1.

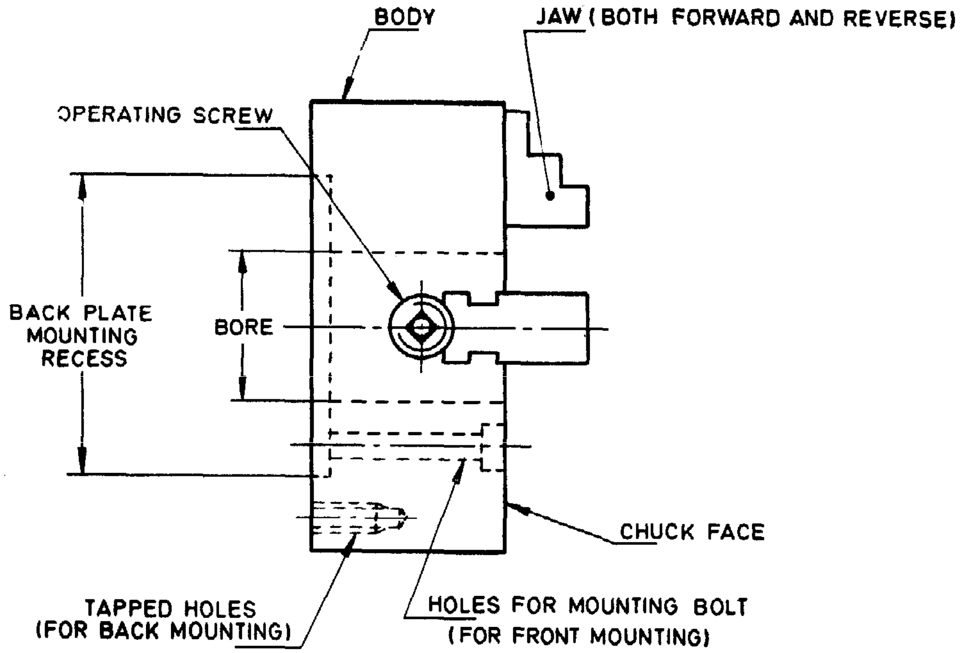
BODY
JAW (BOTH FORWARD AND REVERSE)
OPERATING SCREW
BACK PLATE MOUNTING RECESS
BORE
CHUCK FACE
TAPPED HOLES (FOR BACK MOUNTING)
HOLES FOR MOUNTING BOLT (FOR FRONT MOUNTING)

FIG. 1 NOMENCLATURE

3.1 *Chuck* — Device to be mounted on the spindle nose or a fixture of a machine tool for holding a work piece or a tool.

3.2 *Independent Lathe Chuck* — Chuck in which all the jaws move independently of each other towards or away from the centre of the chuck.

3.3 *Chuck Body* — That part of chuck which carries jaws and encloses operating mechanism.

3.4 *Chuck Face* — That face from which the jaw protrudes. The chuck face shall not be convex.

3.5 *Back Face* — That face of the chuck that contacts the face of the flange or adapter when the chuck is mounted on the machine.

3.6 *Bore of Chuck* — A through central hole in the chuck body.

3.7 *Jaws* — The work holding members in chuck.

3.8 *Operating Screws* — That member which engages with the jaw and by operating which the independent jaws move towards or away from the centre of chuck.

4. Dimensions

4.1 *Type A and Type B* — Shall be as given in Table 1 read with Fig. 2.

Adopted 25 July 1983

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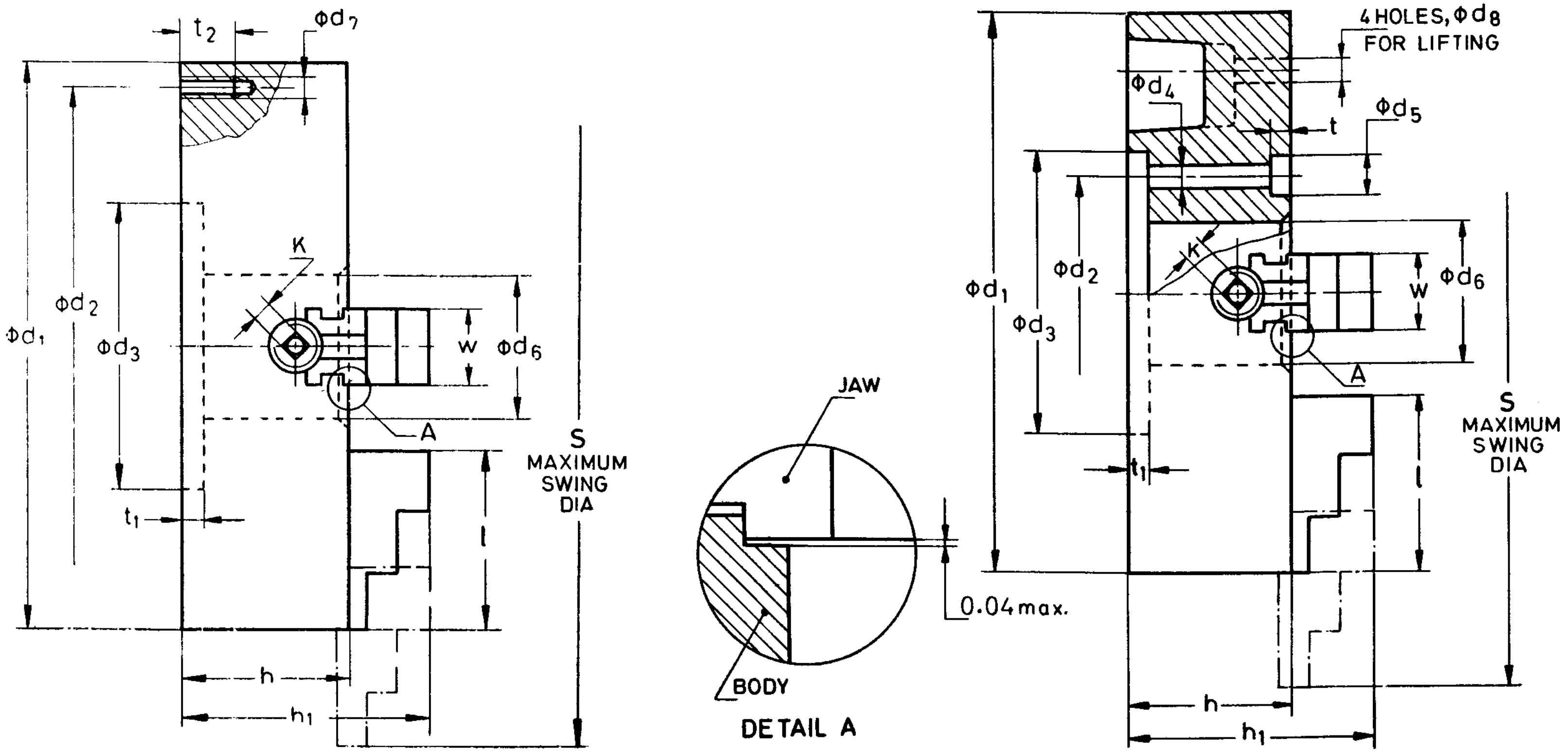


Type A Back Mounted Chuck

Type B Front Mounted Chuck

FIG. 2 DIMENSIONS FOR 4-JAW INDEPENDENT LATHE CHUCKS

TABLE 1 DIMENSIONS FOR 4-JAW INDEPENDENT LATHE CHUCKS — TYPE A AND TYPE B

(*Clauses* 2 *and* 4.1 *and* Fig. 2)

All dimensions in millimetres.

Type	Nominal Size d_1 $\pm 2\cdot5$	P C D d_2 $\pm 0\cdot25$	Mounting Details							d_6	d_7	h	h_1 *Max*	Size of Sq* K	l *Min*	S	t_2	W h7	Approx, weight kg	*Max* Recommended rev/*min*	Lifting hole† d_8 *Min*	Recommended Capacity	
			d_3 H7	No. of through holes	Dia of bolt holes d_4	Bolt Size	Counter bore dia d_5	Counter bore depth t	t_1													*Min*	*Max*
A	80	67	56	4	—	—	—	—	3	20	M6	38	60	5	30	100	12	9·5	2	750	—	3	80
	100	83	70	4	—	—	—	—	4	25	M8	50	75	5	48	130	16	19	3·5	750	—	4	100
	125	108	95	4	—	—	—	—	4	32	M8	50	75	6	48	160	16	19	4·5	750	—	4	125
	160	140	125	4	—	—	—	—	6	45	M10	58	90	6	54	190	20	24	7	750	—	6	160
B	200	82·6	95	4	10·5	M10	16·5	12·0	6	50	—	74	115	9	74	250	—	30	13	750	16	12	200
	250	104·8	125	4	10·5	M10	16·5	12·0	8	60	—	80	125	10	88	310	—	34	22	600	16	18	250
	315	133·4	160	4	13	M12	19·0	14·0	10	75	—	88	140	12	98	380	—	36	36	600	25	18	315
	355	133·4	160	4	13	M12	19·0	14·0	10	85	—	90	140	12	98	420	—	36	45	600	25	18	355
	400	171·4	200	4	17	M16	25·0	18·5	12	100	—	90	145	12	115	475	—	38	56	600	25	25	400
	450	171·4	200	4	17	M16	25·0	18·5	12	100	—	95	150	12	127	530	—	38	73	600	25	25	450
	500	235	260	4	21	M20	31·0	23·0	18	110	—	110	180	14	145	590	—	42	90	450	25	55	500
	560	235	260	4	21	M20	31·0	23·0	18	128	—	115	185	14	145	650	—	42	105	450	25	55	560
	630	235	260	4	21	M20	31·0	23·0	18	140	—	115	185	14	145	720	—	42	150	450	25	55	630

*Dimensions of square K may be selected from the sizes given in IS : 2989-1980 'Keys for lathe chucks (*first revision*)'.

†4 holes are provided on the face of type B chucks for lifting purpose.

Note — Maximum clamping force obtained under the normal working conditions for various chucks should be supplied by the manufacturer.

4.2 *Type C* — Dimensions given for Type A and Type B chucks are also applicable for Type C chucks except the mounting details covered in **4.1**. Type C chucks are suitable for direct-mounting on type A or camlock spindle nose conforming to IS : 2582 (Part 1)-1972 or IS : 2582 (Part 2)-1972, respectively.

5. Material

Body	: Cast from a suitable grade of heavy duty cast-iron having a hardness range of 180 to 220 *HB* or forged or turned from a suitable medium carbon steel having minimum tensile strength of 600 MPa.
Jaws	: Suitable steel of tensile strength not less than 400 MPa properly heat-treated with gripping portion hardened to a hardness between 55 to 60 *HRC*.
Screws and Bearings	: Suitable carbon steel of tensile strength not less than 600 MPa hardened to a hardness between 30 to 40 *HRC* or nickel chromium alloy steel.

6. Designation

6.1 A chuck, back mounted, Type A and of nominal size 160 mm shall be designated as:

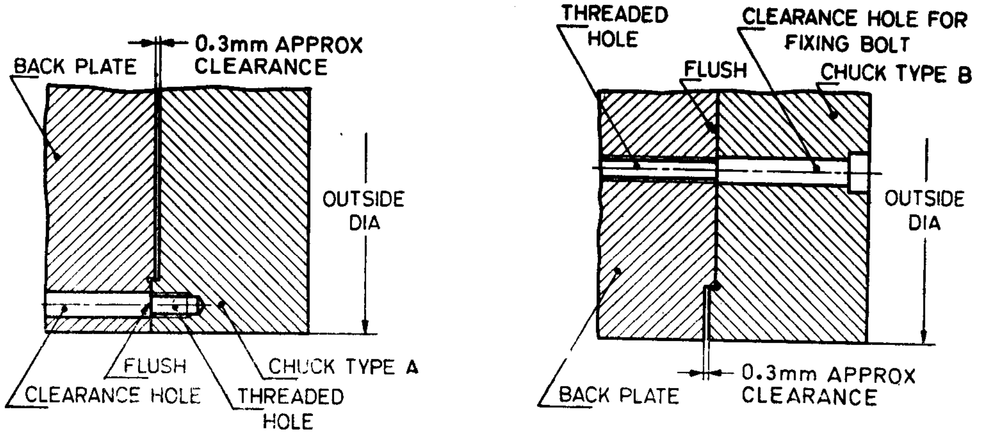
Chuck A 160 IS : ....

6.2 A chuck, direct-mounted, Type C on camlock spindle nose size 6 and of nominal size 315 mm shall be designated as:

Chuck C 315 camlock 6 IS : ....

7. Mounting Instructions

7.1 The lathe chuck shall be mounted on the back plate as shown in Fig. 3.



Back Mounting Arrangement for Type A Chuck   Front Mounting Arrangement for Type B Chuck

FIG. 3 MOUNTING ARRANGEMENT

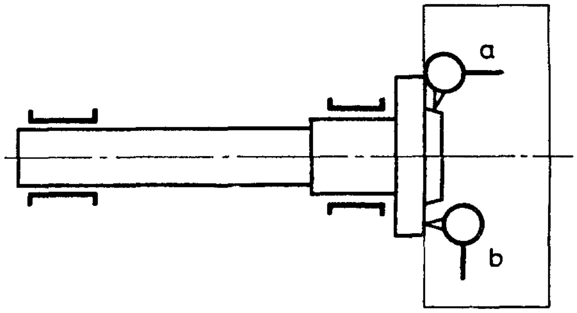
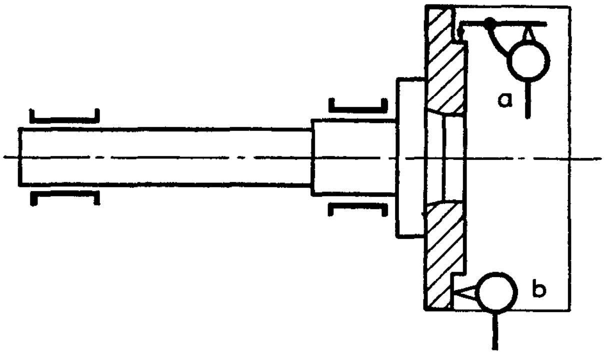
7.2 Chucks may also be made suitable for direct mounting on lathe spindles (*see* Appendix A).

8. Workmanship and Finish — The chuck shall be free from blow holes, cracks flaws, rusts and other defects and shall be well finished.

9. Geometrical Tests

9.1 *Preliminary Remarks* — Since all the geometrical tests to be carried out involve the chuck rotation, the chuck should be mounted on a test spindle flange or adapter. This flange or adapter shall have been previously tested for the accuracy of size, centering, concentricity with the spindle axis and lack of camming of the flange or adapter. The mounting of the chuck on the spindle nose shall be made either directly on the face plate or with an adapter placed between the spindle nose and the chuck. In the latter case, the above mentioned tests shall be carried out directly on the face plate or adapter which has previously been mounted on the spindle nose.

9.1.1 *Spindle accuracy* — For purposes of the tests described in **9.2** and **9.3**, the chuck shall be mounted on a test spindle flange or adapter. The radial runout of the outside diameter of the flange or adapter shall not exceed 0·005 mm as given below:

Figure	Object	Reference to IS : 2063-1962* and/or Instructions for Testing	Permissible Deviation (Total Indicator Reading) mm
Chuck mounted directly on the nose of the test spindle 	a) Radial runout of the outside diameter of flange or adapter	**5.5.1.1** (d) and **5.5.1.2** (a) In the case of tapered spindle nose, the plunger of the dial gauge shall be set normal to the surface which is to be checked	0·005
Chuck mounted on a face plate or adapter 	b) Axial runout (camming) of face of flange or adapter	**5.5.3**	0·005

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*Code for testing machine tools.

Note — The tests in **9** describe the geometrical tests and corresponding permissible deviations of normal accuracy chucks. These deal only with the inspection of rotational accuracy of the chucks, the straightening and the centering of workpieces. These do not apply to other dynamic qualities, such as measurement of counter balancing, or measurement of gripping powers.

9.2 *Concentricity of Outside Diameter of Chuck* — Shall be as given in Table 2.

9.3 *Axial Runout (camming) of Face of Chuck* — Shall be as given in Table 2.

9.4 *Lateral Runout and Flatness of Jaw Step Faces* — Shall be as given in Table 3.

10. Test for Uniformity of Gripping — Shall be as given in Table 4.

11. Packing — The chucks shall be given a suitable rust-preventive treatment at the time of despatch and shall be packed in accordance with best trade practices.

12. Marking

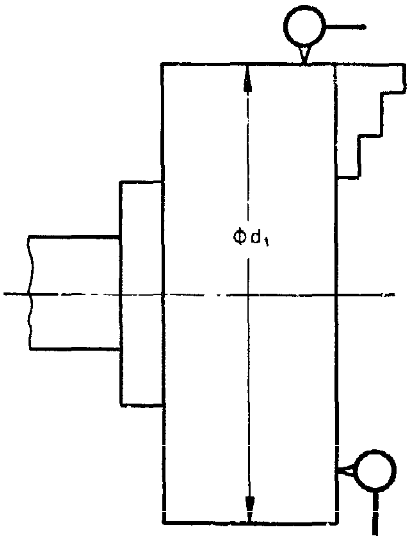
12.1 The chucks shall be marked with the designation and manufacturers' name or trade-mark.

12.2 *ISI Certification Marking* — Details available with the Indian Standards Institution.

TABLE 2 GEOMETRICAL TESTS

(*Clauses* 9.2 *and* 9.3)

All dimensions in millimetres.



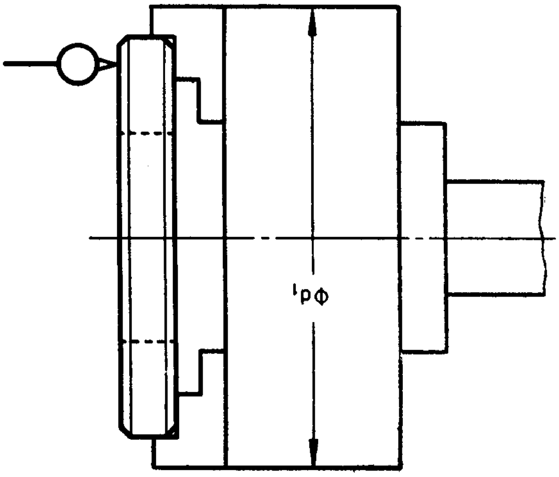
Nominal Size of Chuck d_1		Permissible Deviation (Total Indicator Reading)
Over	Up to and Including	
—	200	0·05
200	400	0·10
400	630	0·125

Note — For test in **9.3** the dial gauge shall be placed on the largest diameter possible.

TABLE 3 GEOMETRICAL TEST

(*Clause* 9.4)

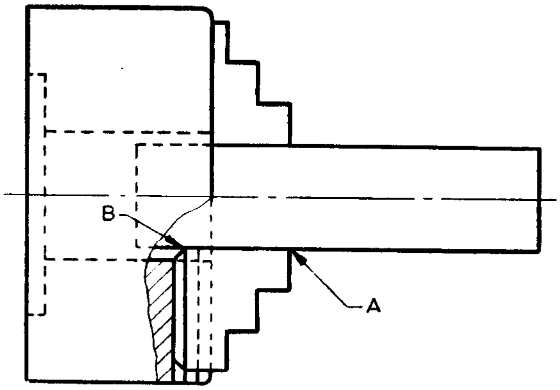
All dimensions in millimetres.



Nominal Size of Chuck d_1		Permissible Deviation (Total Indicator Reading)
Over	Up to and Including	
—	200	0·05
200	400	0·10
400	630	0·125

TABLE 4 TEST FOR UNIFORMITY OF GRIPPING

(*Clause* 10)



Test	Method	Permissible Error
Jaws for uniformity of gripping	Hardened test mandrel gripped in jaws, check at *A* and *B* on each jaw with a feeler gauge	0·04 mm filler gauge shall not pass through

APPENDIX A

(*Clauses* 2 *and* 7.2)

CHUCKS SUITABLE FOR DIRECT MOUNTING ON LATHE SPINDLES

All dimensions in millimetres.

Chuck Size		200	250	315	355	400	450	500	560	630
Spindle Nose Size No.	Type — A As per IS : 2582 (Part 1)-1972	4,5	4,5,6	5,6,8	6,8	6,8,11	8,11	8,11	8,11	8,11
	Camlock Type As per IS : 2582 (Part 2)-1972	4,5	4,5,6	5,6,8	6,8	6,8,11	8,11	8,11	8,11	8,11

EXPLANATORY NOTE

In the preparation of this standard, assistance has been derived from JIS B 6154-1968 'Independent chuck' issued by the Japanese Standards Association (JIS) and DIN 6351 (Sheet 1)-1968 'Lathe chucks, hand-operated jaws also individually adjustable with cylindrical mounting races' issued by the Deutsches Institut fur Normung (DIN).

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